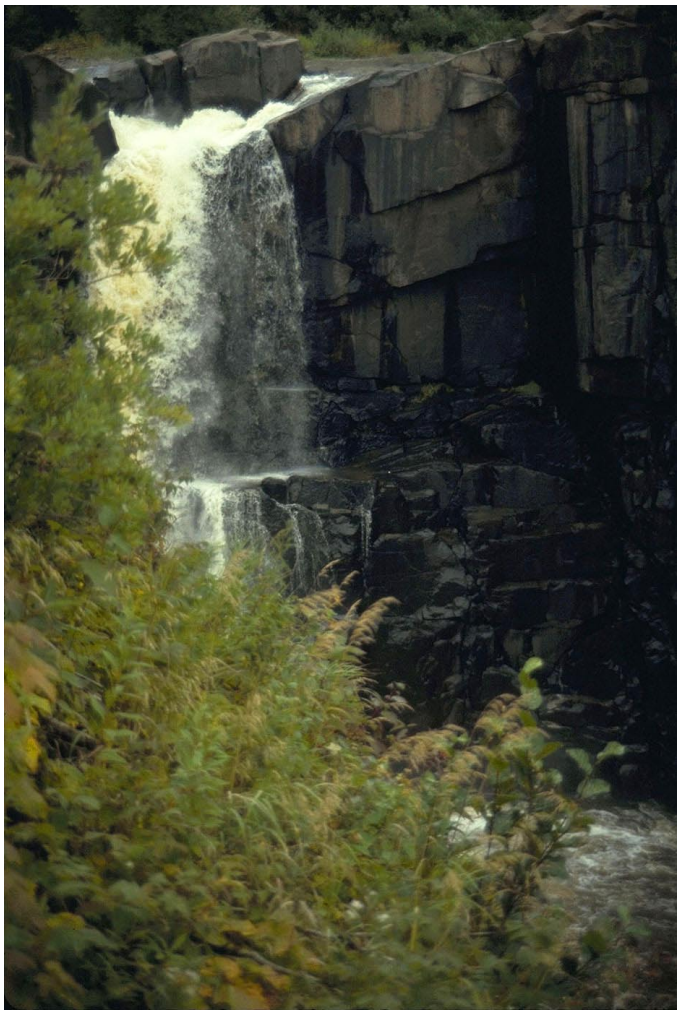
Appendix B

Total Maximum Daily Load (TMDL) Development Strategy for Lake Superior



Pigeon River High Falls, MN-ON Border
Photograph by: Minnesota Sea Grant

Lake Superior Lakewide Management Plan
2000

Appendix B
Total Maximum Daily Load (TMDL) Development Strategy for Lake Superior

1.0 Introduction

This strategy planning document identifies the goals, objectives, processes, and key issues related to the development and use of Total Maximum Daily Loads (TMDL) for the open waters of Lake Superior. The procedures outlined in this document are consistent with those stipulated under the Water Quality Guidance for the Great Lakes System (40 CFR Part 132, Appendix F) and other U.S. Environmental Protection Agency (U.S. EPA) regulations, policy, and guidance promulgated or published under the authority of Section 303 of the Clean Water Act (CWA).

TMDLs for tributaries to Lake Superior are being addressed by the states. Nonetheless, TMDL activities relating to those tributaries are included in this document because of their importance to the quality of the open waters of the lake.

This document is intended to generate discussion and will guide the development of the final TMDL Strategy for Lake Superior. The strategy will map out a plan to coordinate the work of U.S. EPA, the states, and other interested stakeholders involved in the TMDL process. The strategy will not discuss TMDL implementation; that will be part of any TMDL that is ultimately developed. Furthermore, since a TMDL is only one of many tools discussed below for managing the Great Lakes, other protection and restoration efforts will not wait for the development of a TMDL and may eventually make a TMDL for the open waters of the lake unnecessary. As a result, this document is only the first step in a lengthy process.

This strategy planning document is organized in six sections and one appendix. Following this introduction, Section 2.0 provides background on the status of Lake Superior and 303(d) listed water segments within the Lake Superior watershed. Section 3.0 describes the TMDL process and compares it with the Lakewide Management Program (LaMP) program goals defined under the Great Lakes Water Quality Agreement (GLWQA). Section 4.0 describes the key issues to be resolved to develop a Lake Superior TMDL Strategy. Section 5.0 presents a framework for a TMDL strategy to serve as a "strawman" for generating discussion and comment. Section 6.0 briefly describes the next steps in the TMDL strategy development process. Finally, Appendix A lays out the key steps in the TMDL process.

General Relationship Among a TMDL Strategy and Other Management Programs and Tools

The TMDL Strategy will address one of many tools that can be used to manage Great Lakes ecosystem quality. The following discussion generally outlines the statutory basis for water quality management and the variety of tools for addressing water quality impairment in the lakes.

The Lake Superior LaMP describes those programs and activities in greater detail. This introductory discussion is intended to place the TMDL program within the larger context of Great Lakes management.

Statutory Authorities: Setting Goals

The CWA provides the overall goals (fishable, swimmable, and drinkable) and authority for regulating certain activities that affect clean water in this country. In addition, the GLWQA between the United States and Canada defines more specific and common goals for the Great Lakes basin. The states and tribes use provisions of the CWA for designating water body uses and the necessary standards to be met to support those uses. Any request for a National Pollutant Discharge Elimination System permit (NPDES) to discharge into a water body is judged against the designated use for the receiving water body and the adopted state standards. Within the Great Lakes Basin, those water quality standards must meet the Great Lakes Water Quality Guidance objectives, including: 1) being no less restrictive than the limits on pollutants that protect human health, aquatic life and wildlife; 2) encompassing anti-degradation policies; and 3) incorporating implementation procedures.

Tools: Regulatory, Non-regulatory, and Voluntary Approaches for Pollution Control

Under the statutory authorities governing lake water quality management, a variety of regulatory and non-regulatory programs are implemented at the federal, state, and local levels. In addition, the public and private sectors implement voluntary pollution reduction programs and strategies to reduce pollutant load to the lakes. Several of these programs are described below.

Water Discharge Permitting. The CWA prohibits discharges of "pollutants" through a "point source" into a "water of the United States" unless the discharge is authorized under a NPDES permit. The permit specifies limits on effluent concentrations and loads, monitoring and reporting requirements, and other provisions to ensure that the discharge does not impair water quality or human health. In essence, the permit translates general CWA requirements into specific provisions tailored to the operations of each entity discharging pollutants. Michigan, Minnesota, and Wisconsin all have been delegated their NPDES permit programs and are authorized to issue permits.

TMDL - Achieving Water Quality Standards. For those waters not meeting quality standards after application of wastewater treatment technology mandated through an NPDES permit, states are required to calculate a TMDL. TMDL calculations are usually complex and may address a variety of pollutant sources. Although the States have primary responsibility for performing TMDLs, U.S. EPA will provide resources for technical assistance to assist in developing TMDLs, including TMDLs for interstate waters like the Great Lakes.

Technical and Economic Assistance. Pollutant load reductions to the Great Lakes are also supported through technical and economic assistance provided by the basin governments. For example, Section 319 of the CWA authorizes U.S. EPA to provide funds to the States for nonpoint source control project grants. Similarly, the U.S. Department of Agriculture provides economic assistance through the Environmental Quality Incentives Program to aid in controlling agricultural runoff. Overall, scores of federal, state, local, and private assistance programs are available to help reduce pollutants and control pollutant load to the lakes.

Pollution Prevention Partnerships. Partnerships among governments, the private sector, and other interested stakeholders help achieve voluntary pollution reductions. For example, through Partners for the Environment, EPA collaborates with more than 7,000 organizations that use voluntary goals and commitments to achieve measurable environmental results in a timely and cost-effective way. Partners include small and large businesses, citizens groups, state and local governments, universities and trade associations.

The results of voluntary actions taken through more than 20 distinct partnership programs are impressive. Focusing on pollution prevention, organizations set and reach environmental goals such as conserving water and energy or reducing greenhouse gases, toxic emissions, solid wastes, indoor air pollution and pesticide risk.

Tools: Assessing Watershed Conditions

In addition to placing controls on pollutant load to the lake, new programs are in place to improve the long-term assessment of water quality conditions in the basin. The 1998 Clean Water Action Plan (CWAP) began the process of developing *unified watershed assessments* based on the consolidation of information for a whole *watershed* from multiple federal, state, tribal and intergovernmental groups assessment tools. These assessments build upon the data collection, assessment, and reporting activities mandated under Sections 305(b), 303(d), and 304(l) of the CWA. The plan identifies unified watershed Categories I through IV . The categories are: I) not meeting clean water and other natural resources goals, II) prevention action is needed to sustain water quality and aquatic resources, III) outstanding resource waters deserving of the highest protection and IV) watersheds with insufficient data.

Tools: Restoring Degraded Portions of the Lake Superior Ecosystem

Finally, restoration activities administered by the federal government and the states are also an integral part of Great Lakes management. In particular, CERCLA has provided authority and funding to support sediment and other remediation in the Areas of Concern and other degraded areas within the basin. The CWAP calls for states and tribes, working with all appropriate agencies, organizations and the public to identify the Category I watersheds most in need of restoration beginning in the 1999-2000 period. A schedule will be developed and coordinated with the list of waters that do not meet adopted State Water Quality Standards under section

303(d) of the CWA.

Coordinating Lake Management Activities through Planning

The CWAP and the Lake Superior LaMP both call for working with the numerous federal agencies, states, tribes and other organizations to address the impairments. For the portions of Lake Superior requiring a TMDL, a convening and coordinating committee will be identified to address the Lake Superior issues. The time frame for filling the data gaps and the resources available will help determine the TMDL strategy and schedule for Lake Superior. The following discussion provides a starting point for the TMDL Strategy development process.

2.0 Background - Status of Lake Superior and State TMDL Programs

Lake Superior supports many beneficial uses, including recreation, drinking water supply, ecological habitat, and certain industrial and commercial uses. Nonetheless, despite overall reductions in conventional and toxic pollutant loads to Lake Superior over the past 20 years, data indicate that pollutants still exert negative impacts on the chemical, physical, and biological components of the Lake Superior ecosystem. The remaining problems in Lake Superior are significantly related to legacy contamination. Specifically, the lake ecosystem contains contaminants at levels that result in fish consumption advisories, impairments to aquatic organisms and wildlife, impacts on dredging, eutrophication, and contamination of drinking water sources.

Fish consumption advisories are generally the result of elevated PCB, mercury, dioxin-like furans, chlordane, DDE, dieldrin, and toxaphene levels in fish tissue. These advisories also exist in many of the Lake Superior tributaries.

Other pollutants cause or contribute to use impairment on a local or regional scale in Lake Superior. The Stage 1 LaMP identified critical pollutants and pollutant groups present at harmful levels in the ecosystem that require reductions at the source or removal from the ecosystem to restore beneficial uses or to achieve ecosystem objectives or environmental quality criteria. The Lake Superior critical pollutants include the following that are targeted for zero discharge:

- Chlordane
- DDT and metabolites
- Dieldrin/aldrin
- Hexachlorobenzene
- Octachlorostyrene
- PCBs
- 2,3,7,8-TCDD
- Toxaphene
- Mercury

The Lake Superior critical pollutants also include the following critical pollutants that are not targeted for zero discharge and emissions but impair beneficial uses, exceed environmental criteria, and/or do not meet ecosystem objectives:

- Alpha-BHC
- Heptachlor epoxide
- PAHs
- Aluminum
- Arsenic
- Cadmium
- Chromium
- Copper
- Iron
- Lead
- Manganese
- Nickel
- TCDD (TEQ) dioxins and furans
- Zinc

Some pollutant loadings are of concern in Lake Superior and have properties (bioaccumulative, persistent, and toxic) that give them the potential to impair the lake. These chemicals have been found below water quality standards or have not been monitored in Lake Superior. The Stage 1 LaMP identified these pollutants as prevention pollutants. The Stage 2 LaMP proposed a list of prevention pollutants. These prevention pollutants include:

- 2-chloroaniline (4,4-methylenebis)
- 1,4- dichlorobenzene
- 3,3'-dichlorobenzidine
- Hexachlorobutadiene
- beta-BHC
- delta-BHC
- gamma-BHC (Lindane)
- Mirex
- Pentachlorobenzene
- Pentachlorophenol
- Photomirex
- 1,2,3,4-tetrachlorobenzene
- 1,2,4,5-tetrachlorobenzene
- Tributyl tin

303(d) Listed Water Segments

Lake Superior and many of its tributaries are impaired due to fish consumption advisories for mercury and PCBs and do not meet water quality standards for other constituents. Waters that do not meet water quality standards require a state-developed TMDL for each water body and pollutant. There are no lists for degraded waterbodies in Ontario, nor are there timetables for improving such waters. Table 1 lists the impaired water bodies, both Lake Superior segments and U.S. tributaries discharging directly into Lake Superior, the parameters of concern resulting in the State's identification of the impaired or threatened water body under Section 303(d) of the Clean Water Act, and the schedule for completing the TMDL for the water body. Table 1 includes those listed water bodies discharging to Lake Superior.

Table 1. Lake Superior State 303(d) List Summaries

State	Water Body	Schedule	Parameters of Concern								
			WQS-PCBs	WQS-Mercury	FCA-PCBs	FCA-Mercury	E. Coli	Lead	Pesticides	D.O.	Other
MN	Beaver River	1999-2010, 2007-2010		✓							Turbidity
	Brule River	1999-2010		✓							
	Knife River	1999-2010, 2001-2004		✓							Turbidity
	Lester River	1999-2010, 2004-2007		✓							Turbidity
	Poplar River	1999-2010		✓							
	St. Louis Bay	1999-2010		✓							
	St. Louis River	1999-2010		✓							
	Talmadge River	2005-2010								✓	
MI	Carp Creek and River	2003				✓					
	Eagle River, East and West branches	2008									Poor macroinvertebrate, WQS-copper
	Mineral River	2003									Poor macroinvertebrate, WQS-TDS
	Lake Superior										FCA
WI	Allouez Bay				✓	✓					FCA
	Crawford Creek										PAH, petroleum, aquatic toxicity
	Hog Island inlet										PAH, petroleum
	St. Louis Bay				✓	✓					
	St. Louis River				✓	✓					
	Superior Bay				✓	✓					

Notes:

CSO = Combined sewer overflows; D.O. = Dissolved oxygen; FCA = Fish consumption advisory; WQS = Water quality standard

Water Quality Standards Applicable to Lake Superior

Under the Water Quality Guidance for the Great Lakes System, the Great Lakes states and tribes are to adopt numeric water quality criteria and water quality programs that are consistent with 40 CFR Part 132. As a result, once approved by U.S. EPA, water quality standards (WQS) for constituents identified under 40 CFR 132.3 promulgated by the states and tribes for waters in the Lake Superior system will be consistent with the minimum requirements of 40 CFR Part 132. Water quality standards currently promulgated by the states are found at the following:

Minnesota

Minnesota Rules (MR) Chapter 7050.0200 groups surface waters in to one or more usage classes:

- Class 1: Domestic consumption waters
- Class 2: Aquatic life and recreation waters
- Class 3: Industrial consumption waters
- Class 4: Agriculture and wildlife waters
- Class 5: Aesthetic enjoyment
- Class 6: Other uses
- Class 7: Limited resource value waters

MR Chapter 7050.0470 subpart 1 identifies the water use classifications for specific waters in the Lake Superior basin. General WQS applicable to the waters in the Lake Superior basin are found in MR Chapters 7050 and 7065. Minnesota sets WQS specific to for class 2A, 2Bd, 2B, 2C, and 2D waters in the Lake Superior Basin in MR Chapter 7052 for the Great Lakes Initiative pollutants.

Michigan

The State of Michigan sets WQS and methods for calculating standards and criteria for the Great Lakes, the connecting waters, and all other surface waters of the state under Part 4 of the Natural Resources and Environmental Protection Act, Act 451 of 1994.

Wisconsin

The State of Wisconsin sets WQSs and methods for calculating standards and criteria for Wisconsin surface waters under the Wisconsin Administrative Code (WAC) Chapter Natural Resources (NR) 102. WAC Chapter NR 104 sets uses and designated standards for intrastate and interstate waters and WAC Chapter NR 105 sets surface water quality criteria and secondary values for toxic substances. All surface waters within the drainage basin of the Great Lakes are to be protected from the impacts of persistent, bioaccumulating toxic substances by avoiding or limiting to the maximum extent practicable increases in those substances.

3.0 The Relationship Between the TMDL and LaMP Processes

This section first describes the key elements that a Lake Superior TMDL strategy would need to address. The section then provides an overview of the 12 key components or steps in TMDL development. The section concludes with a comparison of the TMDL and LaMP processes.

Key Elements of a TMDL Strategy

Any TMDL strategy developed for Lake Superior should focus on five key elements: 1) Goals and Objectives, 2) Scope and Scale, 3) Monitoring and Data, 4) Coordinated Planning Efforts, and 5) Partnerships.

GOALS AND OBJECTIVES: If the TMDL process is to be successful, sound and achievable goals and objectives must be identified. Several statutory and planning processes have established goals and objectives, along with specific substances identified as critical pollutants that need to be controlled or eliminated. Strategically, it will be important to evaluate all of the associated goals and objectives under the various planning processes to ensure that there are no conflicts. It is also important to evaluate all of the substances identified as pollutants to determine which ones can or should be readily controlled through a TMDL process, and which ones will need to be managed though some other process. As part of a strategic planning process, it will be important to narrow down the goals and objectives, as well as the substances identified as critical pollutants into a clear and concise suite that meets the guidelines for waterbodies or waterbody segments needing TMDLs. The TMDL process is just one of many tools used to address specific goals and objectives and certain critical pollutants that are currently causing an impairment to meeting the designated uses of the Great Lakes and their basins. The development of TMDLs does not preclude the use of other mechanisms to attain the other goals and objectives that have been set forth for the Great Lakes and their basins by the various planning and statutory processes.

Those statutory and planning processes that have identified goals and objectives along with identified critical pollutants include:

1) The designated uses of the waterbody or waterbody segment, as established by the states along with the applicable water quality standards and criteria associated with the identified designated uses (which are to be consistent with the Water Quality Guidance for the Great Lakes System, 40 CFR Part 132).

2) The Great Lakes Initiative which established final water quality guidance for the Great Lakes Systems for criteria limits or methodologies for the control of bioaccumulative chemicals of concern (BCCs), USEPA, March 1995.

3) The Great Lakes Water Quality Agreement which identifies both the 14 beneficial uses for the Great Lakes and the requirement for no increase in toxic loads, 1972, and the amendments of 1978 and 1987.

4) The Canada-Ontario Agreement Respecting the Great Lakes Basin Ecosystem (COA), 1994, which identifies specific substances to be controlled.

5) The International Joint Commission (IJC), 1987, which identified substances as critical pollutants.

6) The Great Lakes Binational Toxics Strategy, which focuses on the virtual elimination of persistent toxic substances in the Great Lakes.

7) The Area of Concerns and their corresponding Remedial Action Plans (RAPs) which have identified goals and objectives.

8) The goals and objectives identified in the LaMPs, along with the substances designated as lakewide critical pollutants.

9) The goals and objectives of the Source Water Protection Planning process.

10) The goals and objectives as set forth by the CWAP which has defined key actions and milestones.

11) The goal of zero discharge and zero emission for the nine designated chemical as set forth by the Binational Program to restore and protect the Lake Superior basin.

SCOPE AND SCALE: Because of the large geographic size of the Great Lakes and their basins, and the complexity of impairments and sources of those impairments, it is necessary to clearly identify both the scope and scale that can be managed by the TMDL process. It is also important to understand that the TMDL process functions through the use of a mathematical model that at best can only predict possible results, but not necessarily actual results.

First, the scope of the overall TMDL process within the lake and its basin should be defined. Beyond defining the impairments, it is important that both the causes and sources of the impairments be identified. Therefore, the initial scope should focus on three main categories as possible sources of impairment: tributaries, air deposition, and in-place or legacy pollutants. Under each one of these categories, additional sources can be further defined, such as point and nonpoint sources for tributaries, local and distant point and nonpoint sources for air deposition, and sites for in-place pollutants such as AOCs or Superfund sites. Each of those issues could then be addressed by the TMDL process within an identified scale.

MONITORING AND DATA: Because the Great Lakes are a very complex system, the need for sound, scientifically credible data is critical to being able to produce TMDLs that result in reasonable load allocations that fall within an acceptable confidence range. It is also important that the data used in the modeling component of a TMDL is scientifically sound and credible. That consideration is especially important because the loads that are to be allocated for control are in some cases regulatory.

It is also very important that the data be of high quality, since the implementation plans associated with the load allocations should reasonably result in water quality improvement and meet WQSs. COORDINATED PLANNING EFFORTS: Because of the many issues associated with maintaining and protecting the water quality of the Great Lakes and their associated basins, numerous planning efforts are currently ongoing. Some of these planning efforts were defined under the goals and objectives section of this document. Other planning efforts will include the TMDL implementation plans and any program activities that may or may not be incorporated into the TMDL implementation plans.

Effectively implementing this process will require committed leadership and the ability to develop and maintain good partnerships.

PARTNERSHIPS: To develop Great Lake TMDLs, and ensure effective implementation of the TMDL implementation plans, effective partnerships must be developed. To establish effective partnerships for both the development and the implementation of TMDLs within the Great Lakes and their associated basins, the following strategic approach is presented.

1) Identify the lead agency or agencies that will be responsible for developing and maintaining the needed partnerships for developing and implementing the TMDL process.

2) Identify the needed partners and define their role and responsibility to ensure the effective development and implementation of the TMDLs and the TMDL implementation plans.

3) Identify the partners in two major categories: those that would function in a statutory or regulatory mode and those that would function in a voluntary mode.

4) Evaluate the partners' resource capability in being able to carry out their defined roles and responsibilities. When there is a lack of resources, determine the options that might be available to assist or reinforce resource capabilities for partners.

5) Develop and define a forum through which partners can be brought together to exchange information, and work effectively to develop and implement TMDLs.

Components of a TMDL

Section 303(d) of the CWA, EPA's implementing regulations at 40 CFR Part 130, and the Water Quality Guidance for the Great Lakes System (40 CFR Part 132) describe the statutory and regulatory requirements for approveable TMDLs. The minimum components of a TMDL are outlined in Addendum A of this document and include the following:

1) Description of Waterbody, Impairment or Standard Violation, Pollutant of Concern, Pollutant Sources and Priority Ranking

2) Description of TMDL Endpoints -- Applicable Water Quality Standards and Numeric Water Quality Targets
3) Loading Capacity - Linking Water Quality and Pollutant Sources
4) Load Allocations (LAs)
5) Wasteload Allocations (WLAs)
6) Margin of Safety (MOS)
7) Seasonal Variation
8) Monitoring Plan for TMDLs Developed Under the Phased Approach
9) Implementation Plans (recommended under current policy)
10) Reasonable Assurances of Implementation
11) Public Participation
12) Submittal Letter

In addition, 40 CFR Part 132 provides specific requirements relating to TMDL development in the Great Lakes basin.

Revisions to the TMDL process are expected in the year 2000. New regulations have been proposed that will change what is required for both the Section 303(d) lists and for an approvable TMDL. Under the proposed regulations, the States are responsible for developing the list of impaired or threatened waters every two years (this requirement may change). Impairment is defined as those waters that do not meet the designated use or the appropriate WQS.

The Lakewide Management Plan process is outlined under the GLWQA of 1978. Under the GLWQA, as amended by the Protocols of 1983 and 1987, the United States and Canada (the Parties) agreed ". . . to restore and maintain the chemical, physical, and biological integrity of the waters of the Great Lakes Basin Ecosystem." To achieve this purpose, the Parties agreed to develop and implement, in consultation with state governments, provincial governments, and tribes, LaMPs for open lake waters.

In the case of Lake Superior, the Lakewide Management Plan development effort has been led by the United States and Canada. As specified in Annex 2 of the GLWQA, the LaMP for Lake Superior is designed to reduce loadings of critical pollutants in order to restore 14 designated beneficial uses and prevent increases in pollutant loadings in areas where the specific objectives of the agreement are not exceeded. Moreover, the Specific Objectives Supplement to Annex I of the GLWQA requires the development of ecosystem objectives for Lake Superior. Pursuant to that charge, the Lake Superior LaMP embodies a systematic and comprehensive ecosystem approach to restoring and protecting beneficial uses by seeking a balance between critical pollutant reduction and ecosystem sustainability in open lake waters and the watersheds that comprise the lake basin.

Comparison of the TMDL and the LaMP Processes

The TMDL and LaMP processes are fundamentally similar, but there are several key distinctions between them:

1) Both processes are intended to achieve clearly defined endpoints -- a WQS or numeric water quality target in the case of a TMDL, and a set of ecosystem objectives under the LaMP. However, the TMDL endpoints focus solely on WQSs, while the LaMP considers other ecosystem objectives in addition to numeric water quality targets. For example, the LaMP calls for the removal of restrictions on fish and wildlife consumption, prevention of bird or animal deformities or reproduction problems, and protection of the benthos. As a result, the LaMP process has identified over 20 critical pollutants to serve as the focus for the management activities, while a TMDL for the open waters of the lake will focus on only those pollutants that are linked to water quality standard exceedances.

2) Both processes require a documented status of the ecosystem.

3) Management planning to achieve ecosystem objectives is a key component of the LaMP. Implementation planning is recommended under the TMDL process and may be a required part of an approvable TMDL under the proposed regulations. However, planning is currently not the central focus of a TMDL.

4) Developing a direct link between pollutant load and achievement of the endpoint, often through water quality modeling, is a critical component of a TMDL. In contrast, the LaMP describes the relationship between loading and achievement of an ecosystem objective as a partnership effort involving the governments, tribes, and non-governmental sectors of the basin.

5) Both processes require an integrated monitoring plan for the lake.

6) Both processes require data, but the data are to be measured against different objectives.

7) The Lake Superior Binational Program goal of zero discharge is incorporated in the LaMP. This goal of zero discharge and zero emission goes beyond the TMDL requirement of allocating loads in such a way that WQSs are met.

In sum, the TMDL and LaMP processes are intended to achieve the common objective of restoring the Lake Superior ecosystem. However, a TMDL defines ecosystem protection more narrowly through the application of water quality standards and places great emphasis on understanding the relationship between pollutant load and achievement of the standard. In contrast, the LaMP defines ecosystem protection and restoration more broadly and places greater emphasis on pollution control planning and developing implementation targets.

4.0 Issues to Be Resolved

A number of key issues have been identified to better coordinate LaMP and TMDL activities (options for addressing each of these issues will be developed under the TMDL Strategy).

Issue 1: Identifying roles and responsibilities for each of the listed waters: tributaries, nearshore waters, open waters of the lake.

Issue 2: Should the lake be partitioned into segments that would be easier and more efficient to address with TMDLs?

Issue 3: Encourage consistency in 303(d) listing procedures among the States.

Issue 4: Maintain consistency in endpoint determinations (water quality standards) among the States.

Issue 5: Review the use of mass balance and other special studies on the lake with regard to their applicability to support a TMDL.

Issue 6: Integrate with other Programs (e.g., Source Water Protection Program).

Issue 7: Clarify the relationship between LaMP restoration and protection goals and TMDL endpoints (water quality standards).

Issue 8: Investigate options for addressing air deposition of TMDL pollutants.

Issue 9: Develop approaches for determining margin of safety when addressing fish consumption advisories.

Issue 10: Maintain consistency among the five Great Lakes.

Issue 11: Define the role of the Tribes in the TMDL process.

5.0 Strawman Framework for a Lake Superior TMDL Strategy

As a a means of generating discussion on the likely components of a Lake Superior TMDL Strategy, the following "strawman" framework is offered.

Process

To develop the TMDLs for the Great Lakes, the process will include:

1) Identify the impairments.

2) If at all possible, identify impaired segments.

3) Approve the listing of the segment under Section 303(d).

4) Generate the TMDL.

A) Determination of sources - While air deposition of mercury and PCBs may pose the largest portion of the load of these two pollutants to the lakes, other sources will have to be identified, including natural background. In addition, there are other portions of the lakes identified on the 1998 lists for impairments other than fish consumption advisories.

B) Determination of loads from the sources - Significant amounts of data already exist regarding the Great Lakes, much of it generated during the LaMP process. Additional information is being gathered regarding air deposition of mercury in the Devil's Lake Pilot Project. Data from this project, as well as other air deposition mercury projects, will be incorporated as generated in the development of any appropriate TMDL.

Numerous TMDLs are scheduled on tributaries to the various Great Lakes. These will certainly result in the generation of addition data regarding loading of pollutants to the Great Lakes, as well as result in lower loadings as the TMDLs are implemented.

Although much data exists, there are significant data gaps that have been identified. These include:

1) Relevant information on TMDLs or Mass Balance Activities for interstate or other waters that may contribute insight into TMDLs for Great Lakes listed waters.

2) Discussion of impairments listed in LaMPs and the TMDL lists, and the relationship to State Standards.

3) Air deposition data for mercury and PCBs in the Great Lakes basin

As the process moves forward, there will certainly be numerous data gaps noted. As they are noted, it will be important to determine if the data exists elsewhere, and if not, who should be working to gather the data (Feds, State, contractor, other, etc)

C) Determining the maximum load that will not cause a violation of WQS

D) Allocating the load to the various sources

E) Developing an implementation plan to ensure the TMDL is carried out

Time Frame -

A 15 year time frame is available to complete a TMDL. Is this timeframe consistent with state expectations?

Roles and Responsibilities -

Some states have written into their 303(d) lists that the U.S. EPA is responsible for developing the Great Lakes TMDLs for air deposition pollutants, while other states have made a more qualified statement.

> Federal role - The federal role in the Great Lakes TMDL process is at a minimum: 1) approve/disapprove 303(d) lists; 2) approve/disapprove the TMDLs. If the lists or TMDLs are disapproved, then the U.S. EPA has the responsibility to issue appropriate lists or TMDLs. However, the federal role will be much larger than that stated above. The U.S. EPA will take the lead on "open water" TMDLs, serve to facilitate the generation of the TMDLs, provide funding through various mechanisms, assist in data gathering (especially for air deposition pollutants), provide technical support, coordinate efforts among the states, serve as information repository, and provide legal analysis and support.
>
> State role - List impaired waters, take the lead on tributary water TMDLs, and provide support and data for "open water" TMDLs.

6.0 Next Steps in the TMDL Development Process

This document is only the first step in the process to develop a TMDL Strategy for Lake Superior. U.S. EPA envisions the following next steps in this process:

1) Gather comments on this strategy planning document and the issues identified in Section 4.0.

2) Convene regulators in the Fall of 2000 to begin discussions on the following:

   a) the outstanding issues identified in Section 4.0 of this document,
   b) plans for a Winter 2001 information meeting,
   c) plans for future stakeholder meetings,
   d) clarifying resource needs and availability, and
   e) investigating the formation of work groups.

3) Convene an information meeting in the Winter of 2001 to review information collected on pollutant load to the lake, including the preliminary results of the Devil's Lake Mercury Pilot Study. Review changes to the TMDL regulations and guidance.

4) Convene a series of stakeholder meetings and/or workshops to inform the development of a

draft Lake Superior TMDL Strategy.

U.S. EPA has not yet developed a final schedule for these next steps. U.S. EPA welcomes comments on these proposed next steps, a schedule of activities, and any issues raised in this strategy planning document.

ADDENDUM A

REVIEW ELEMENTS OF TMDLs

Section 303(d) of the Clean Water Act (CWA) and EPA's implementing regulations at 40 CFR Part 130 and the Water Quality Guidance for the Great Lakes System (40 CFR Part 132) describe the statutory and regulatory requirements for approvable TMDLs. The following information is generally necessary for EPA to determine if a submitted TMDL fulfills the legal requirements for approval under Section 303(d) and EPA regulations, and should be included in the submittal package. Use of the verb "must" below denotes information that is required to be submitted because it relates to elements of the TMDL required by the CWA and by regulation.

1. Description of Waterbody, Pollutant of Concern, Pollutant Sources and Priority Ranking

The TMDL analytical document must identify the waterbody as it appears on the State/Tribe's 303(d) list, the pollutant of concern and the priority ranking of the waterbody. The TMDL submittal must include a description of the point and nonpoint sources of the pollutant of concern, including the magnitude and location of the sources. Where it is possible to separate natural background from nonpoint sources, a description of the natural background must be provided, including the magnitude and location of the source(s). Such information is necessary for EPA's review of the load and wasteload allocations which are required by regulation. The TMDL submittal should also contain a description of any important assumptions made in developing the TMDL, such as: (1) the assumed distribution of land use in the watershed; (2) population characteristics, wildlife resources, and other relevant information affecting the characterization of the pollutant of concern and its allocation to sources; (3) present and future growth trends, if taken into consideration in preparing the TMDL; and, (4) explanation and analytical basis for expressing the TMDL through *surrogate measures*, if applicable. *Surrogate measures* are parameters such as percent fines and turbidity for sediment impairments, or chlorophyl *a* and phosphorus loadings for excess algae.

2. Description of the Applicable Water Quality Standards and Numeric Water Quality Target

The TMDL submittal must include a description of the applicable State/Tribe water quality standard, including the designated use(s) of the waterbody, the applicable numeric or narrative water quality criterion, and the antidegradation policy. Such information is necessary for EPA's review of the load and wasteload allocations which are required by regulation. A numeric water quality target for the TMDL (a quantitative value used to measure whether or not the applicable water quality standard is attained) must be identified. If the TMDL is based on a target other than a numeric water quality criterion, then a numeric expression, usually site specific, must be developed from a narrative criterion and a description of the process used to derive the target must be included in the submittal.

3. Loading Capacity - Linking Water Quality and Pollutant Sources

As described in EPA guidance, a TMDL identifies the loading capacity of a waterbody for a particular pollutant. EPA regulations define loading capacity as the greatest amount of loading that a water can receive without violating water quality standards (40 CFR § 130.2(f)). The loadings are required to be expressed as either mass-per-time, toxicity or other appropriate measure (40 CFR § 130.2(I)). The TMDL submittal must identify the waterbody's loading capacity for the applicable pollutant and describe the rationale for the method used to establish the cause-and-effect relationship between the numeric target and the identified pollutant sources. In

most instances, this method will be a water quality model. Supporting documentation for the TMDL analysis must also be contained in the submittal, including the basis for assumptions, strengths and weaknesses in the analytical process, results from water quality modeling, etc. Such information is necessary for EPA's review of the load and wasteload allocations which are required by regulation.

In many circumstances, a *critical condition* must be described and related to physical conditions in the waterbody as part of the analysis of loading capacity (40 CFR § 130.7(c)(1)). The critical condition can be thought of as the "worst case" scenario of environmental conditions in the waterbody in which the loading expressed in the TMDL for the pollutant of concern will continue to meet water quality standards. *Critical condition*s are the combination of environmental factors (e.g., flow, temperature, etc.) that results in attaining and maintaining the water quality criterion and has an acceptably low frequency of occurrence. *Critical conditions* are important because they describe the factors that combine to cause a violation of water quality standards and will help in identifying the actions that may have to be undertaken to meet water quality standards. Stream design guidelines for Great Lakes tributaries are specified under 40 CFR Part 132, Appendix F.

4. Load Allocations (LAs)

EPA regulations require that a TMDL include LAs, which identify the portion of the loading capacity allocated to existing and future nonpoint sources and to natural background (40 CFR. § 130.2(g) and 40 CFR 132, Appendix F). Load allocations may range from reasonably accurate estimates to gross allotments (40 CFR. § 130.2(g)). Where it is possible to separate natural background from nonpoint sources, load allocations should be described separately for background and for nonpoint sources.

If the TMDL concludes that there are no nonpoint sources and/or natural background, or the TMDL recommends a zero load allocation, the LA must be expressed as zero. If the TMDL recommends a zero LA after considering all pollutant sources, there must be a discussion of the reasoning behind this decision, since a zero LA implies an allocation only to point sources will result in attainment of the applicable water quality standard, and all nonpoint and background sources will be removed.

5. Wasteload Allocations (WLAs)

EPA regulations require that a TMDL include WLAs, which identify the portion of the loading capacity allocated to existing and future point sources (40 CFR § 130.2(h) and 40 CFR 132, Appendix F). If no point sources are present or if the TMDL recommends a zero WLA for point sources, the WLA must be expressed as zero. If the TMDL recommends a zero WLA after considering all pollutant sources, there must be a discussion of the reasoning behind this decision, since a zero WLA implies an allocation only to nonpoint sources and background will result in attainment of the applicable water quality standard, and all point sources will be removed.
In preparing the wasteload allocations, it is not necessary that each individual point source be assigned a portion of the allocation of pollutant loading capacity. When the source is a minor discharger of the pollutant of concern or if the source is contained within an aggregated general permit, an aggregated WLA can be assigned to the group of facilities. But it is necessary to allocate the loading capacity among individual point sources as necessary to meet the water quality standard.

The TMDL submittal should also discuss whether a point source is given a less stringent wasteload allocation based on an assumption that nonpoint source load reductions will occur. In such cases, the State/Tribe will need to demonstrate reasonable assurance that the nonpoint source reductions will occur within a reasonable time.

6. Margin of Safety (MOS)

The statute and regulations require that a TMDL include a margin of safety to account for any lack of knowledge concerning the relationship between load and wasteload allocations and water quality (CWA § 303(d)(1)(C), 40 CFR §130.7(c)(1), and 40 CFR 132, Appendix F). EPA guidance explains that the MOS may be implicit, i.e., incorporated into the TMDL through conservative assumptions in the analysis, or explicit, i.e., expressed in the TMDL as loadings set aside for the MOS. If the MOS is implicit, the conservative assumptions in the analysis that account for the MOS must be described. If the MOS is explicit, the loading set aside for the MOS must be identified.

7. Seasonal Variation

The statute and regulations require that a TMDL be established with consideration of seasonal variations. The method chosen for including seasonal variations in the TMDL must be described (CWA § 303(d)(1)(C), 40 CFR § 130.7(c)(1)).

8. Monitoring Plan for TMDLs Developed Under the Phased Approach

EPA's 1991 document, *Guidance for Water Quality-Based Decisions: The TMDL Process* (EPA 440/4-91-001), recommends a monitoring plan when a TMDL is developed under the phased approach. The guidance recommends that a TMDL developed under the phased approach also should provide assurances that nonpoint source controls will achieve expected load reductions. The phased approach is appropriate when a TMDL involves both point and nonpoint sources and the point source is given a less stringent wasteload allocation based on an assumption that nonpoint source load reductions will occur. EPA's guidance provides that a TMDL developed under the phased approach should include a monitoring plan that describes the additional data to be collected to determine if the load reductions required by the TMDL lead to attainment of water quality standards.

9. Implementation Plans

On August 8, 1997, Bob Perciasepe (EPA Assistant Administrator for the Office of Water) issued a memorandum, "New Policies for Establishing and Implementing Total Maximum Daily Loads (TMDLs)," that directs Regions to work in partnership with States/Tribes to achieve nonpoint source load allocations established for 303(d)-listed waters impaired solely or primarily by nonpoint sources. To this end, the memorandum asks that Regions assist States/Tribes in developing implementation plans that include reasonable assurances that the nonpoint source load allocations established in TMDLs for waters impaired solely or primarily by nonpoint sources will in fact be achieved. The memorandum also includes a discussion of renewed focus on the public participation process and recognition of other relevant watershed management processes used in the TMDL process. Although implementation plans are not approved by EPA, they help establish the basis for EPA's approval of TMDLs.

10. Reasonable Assurances

EPA guidance calls for reasonable assurances when TMDLs are developed for waters impaired by both point and nonpoint sources. In a water impaired by both point and nonpoint sources, where a point source is given a less stringent wasteload allocation based on an assumption that nonpoint source load reductions will occur, reasonable

assurance that the nonpoint source reductions will happen must be explained in order for the TMDL to be approvable. This information is necessary for EPA to determine that the load and wasteload allocations will achieve water quality standards.

In a water impaired solely by nonpoint sources, reasonable assurances that load reductions will be achieved are not required in order for a TMDL to be approvable. However, for such nonpoint source-only waters, States/Tribes are strongly encouraged to provide reasonable assurances regarding achievement of load allocations in the implementation plans described in section 9, above. As described in the August 8, 1997 Perciasepe memorandum, such reasonable assurances should be included in State/Tribe implementation plans and "may be non-regulatory, regulatory, or incentive-based, consistent with applicable laws and programs."

11. Public Participation

EPA policy is that there must be full and meaningful public participation in the TMDL development process. Each State/Tribe must, therefore, provide for public participation consistent with its own continuing planning process and public participation requirements (40 CFR § 130.7(c)(1)(ii)). In guidance, EPA has explained that final TMDLs submitted to EPA for review and approval must describe the State/Tribe's public participation process, including a summary of significant comments and the State/Tribe's responses to those comments. When EPA establishes a TMDL, EPA regulations require EPA to publish a notice seeking public comment (40 CFR § 130.7(d)(2)).

Inadequate public participation could be a basis for disapproving a TMDL; however, where EPA determines that a State/Tribe has not provided adequate public participation, EPA may defer its approval action until adequate public participation has been provided for, either by the State/Tribe or by EPA.

12. Submittal Letter

A submittal letter should be included with the TMDL analytical document, and should specify whether the TMDL is being submitted for a *technical review* or is a *final submittal*. Each final TMDL submitted to EPA must be accompanied by a submittal letter that explicitly states that the submittal is a final TMDL submitted under Section 303(d) of the Clean Water Act for EPA review and approval. This clearly establishes the State/Tribe's intent to submit, and EPA's duty to review, the TMDL under the statute. The submittal letter, whether for technical review or final submittal, should contain such information as the name and location of the waterbody, the pollutant(s) of concern, and the priority ranking of the waterbody.